Hi-C Observations of Penumbral Bright Dots:
Comparison with the IRIS Results

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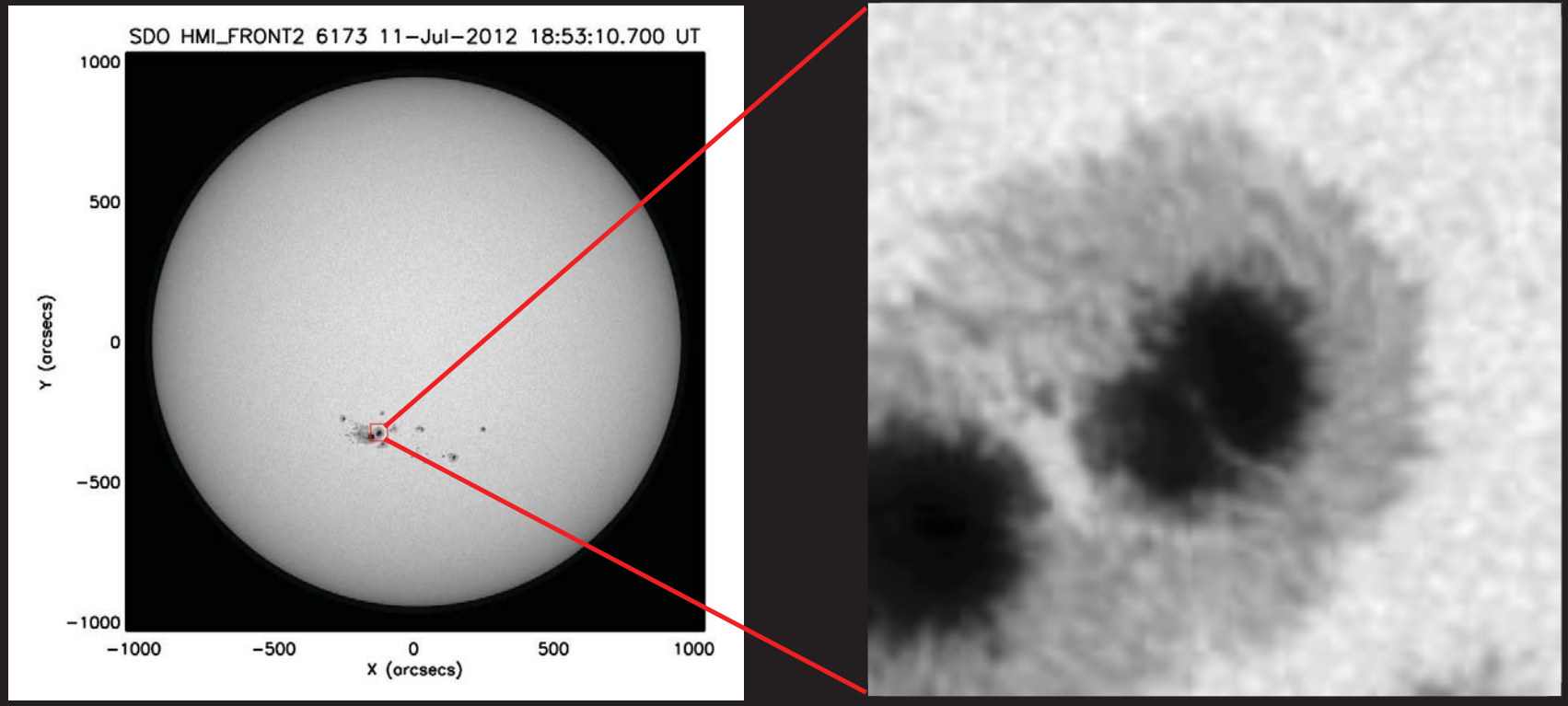
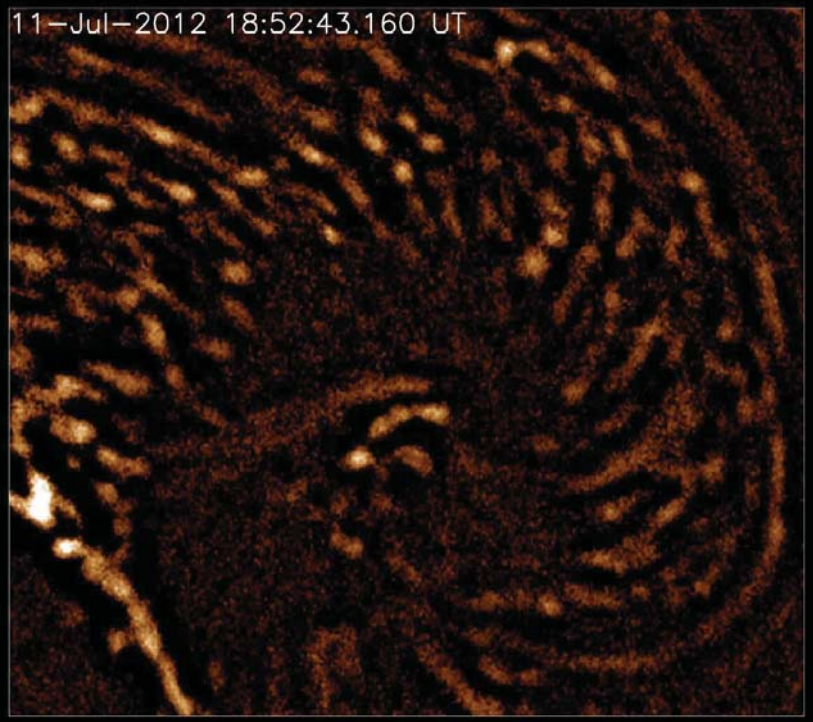
Overview

- Penumbral bright dots in brief
- Qualitative description
- Quantitative properties
- Comparison to IRIS observations
- Possible causes

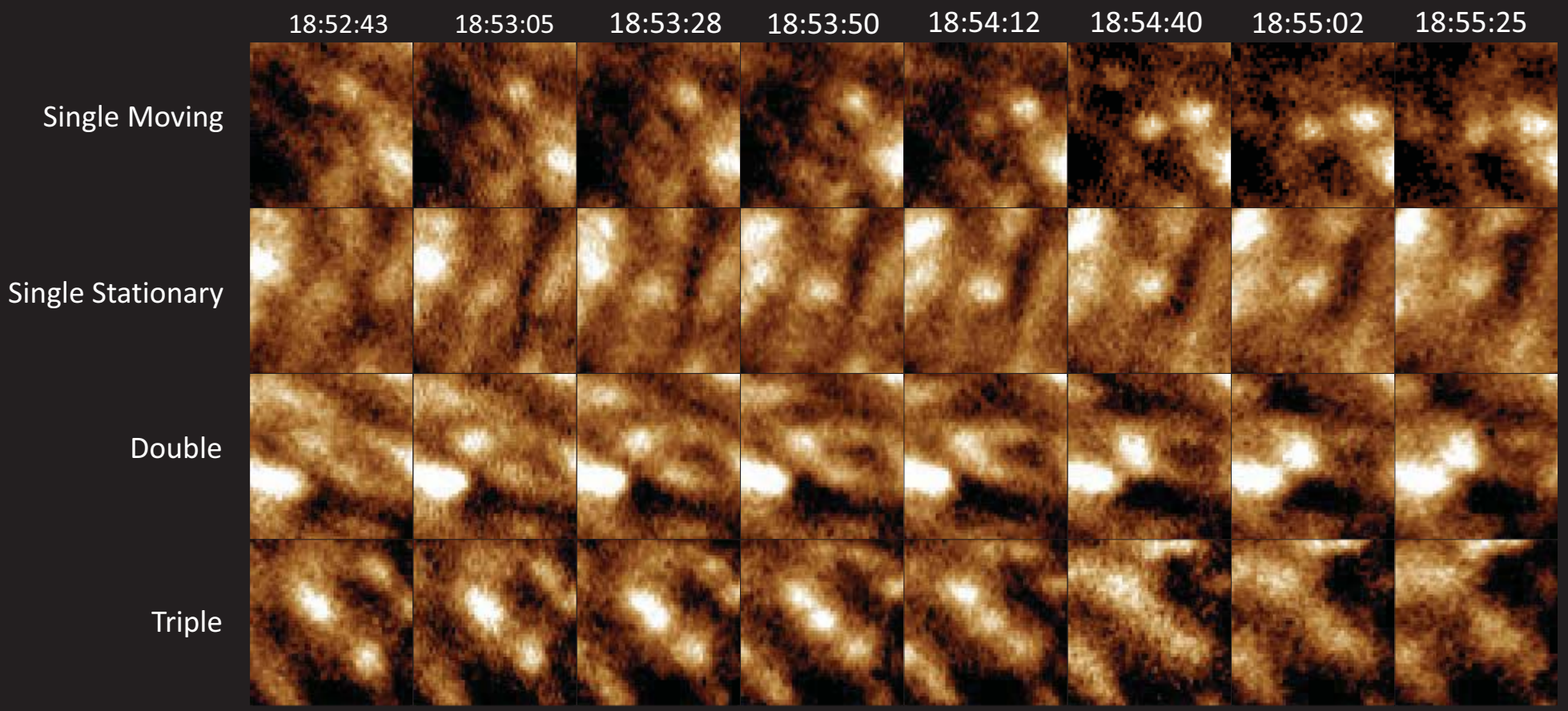
Penumbral Dots in Brief



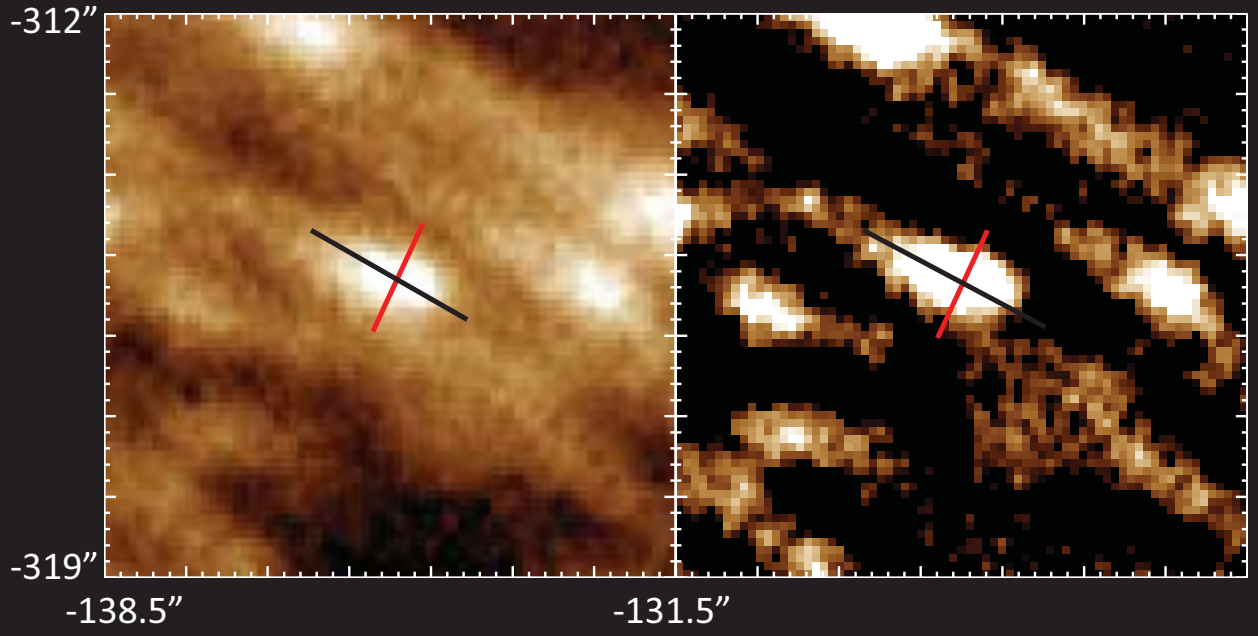
Qualitative Description

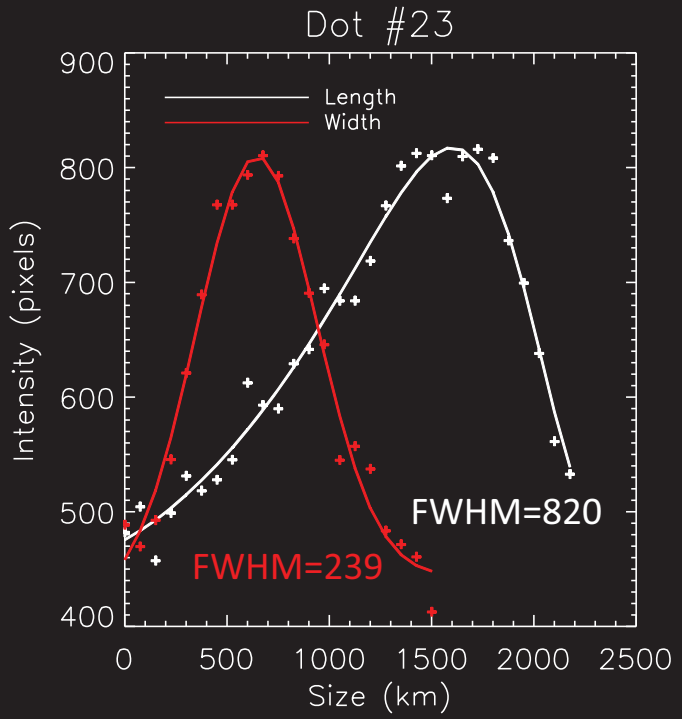


Qualitative Description

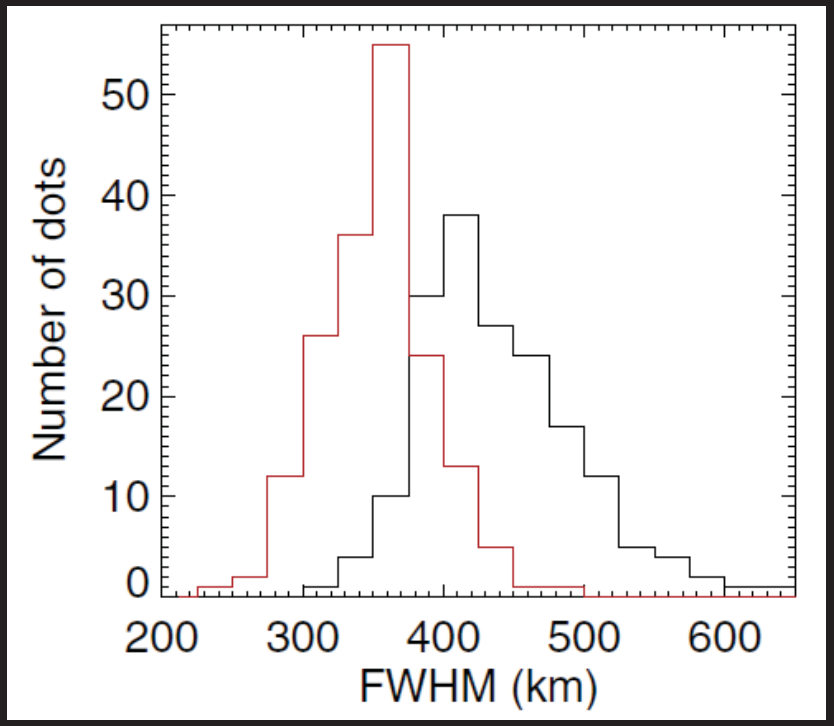


Quantitative Properties - Size

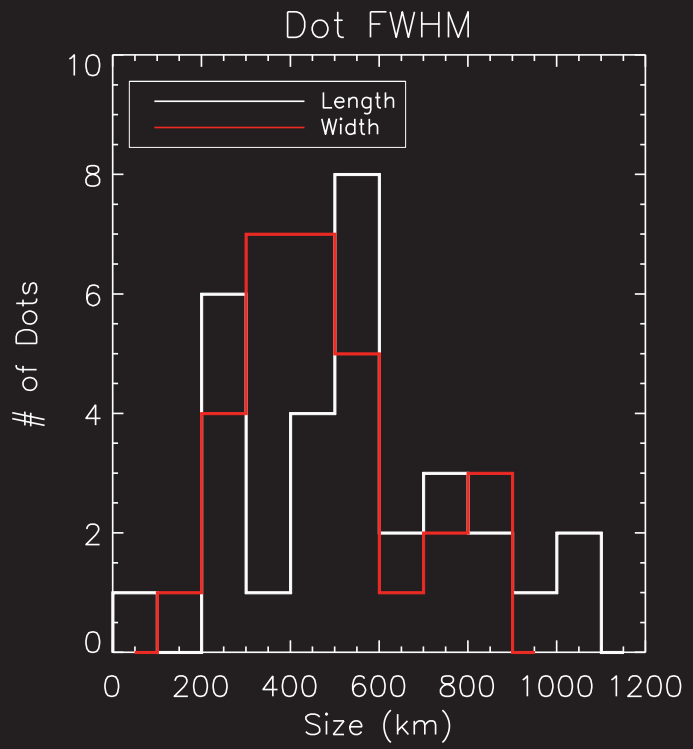




Quantitative Properties - Size

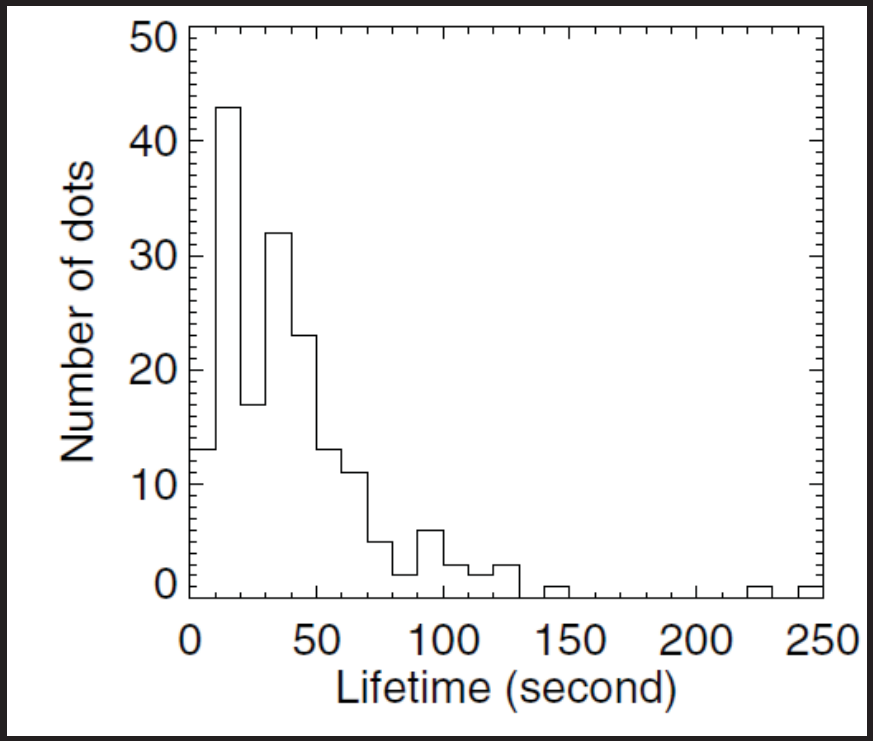


Tian et al. (2014) ApJ, 790, L29

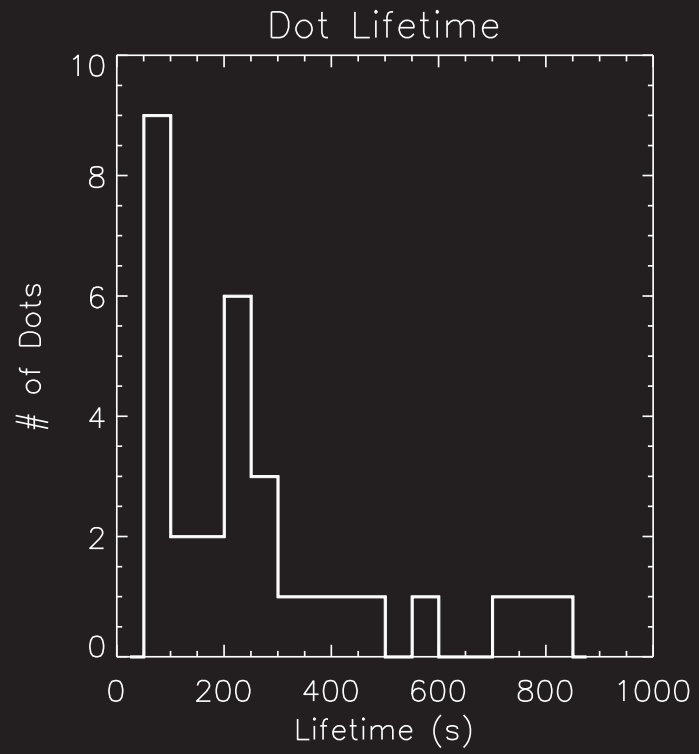


Alpert et al. (2014) (pending)

Quantitative Properties – Lifetime

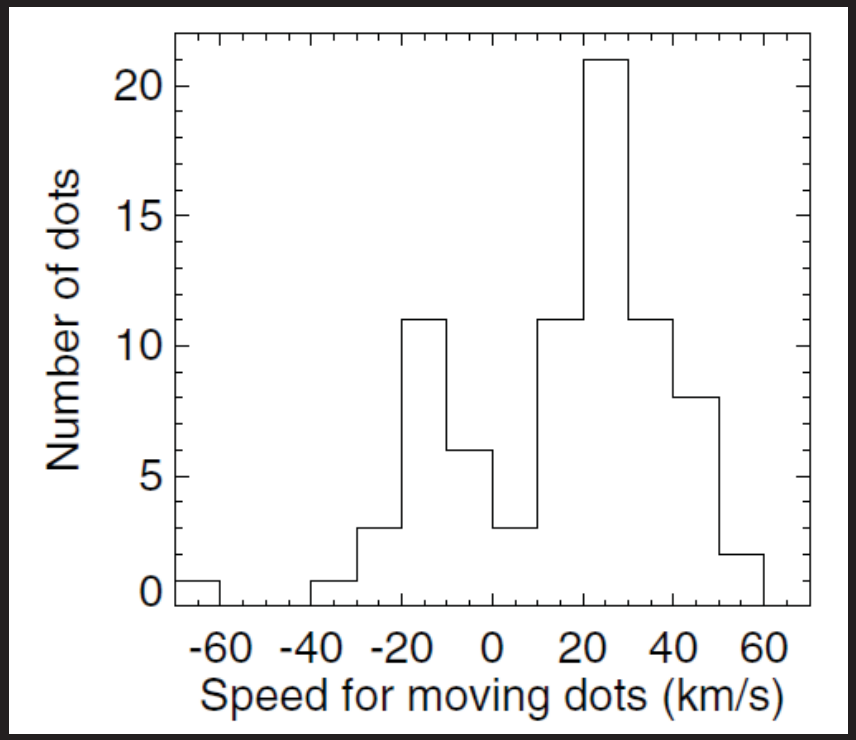


Tian et al. (2014) ApJ, 790, L29

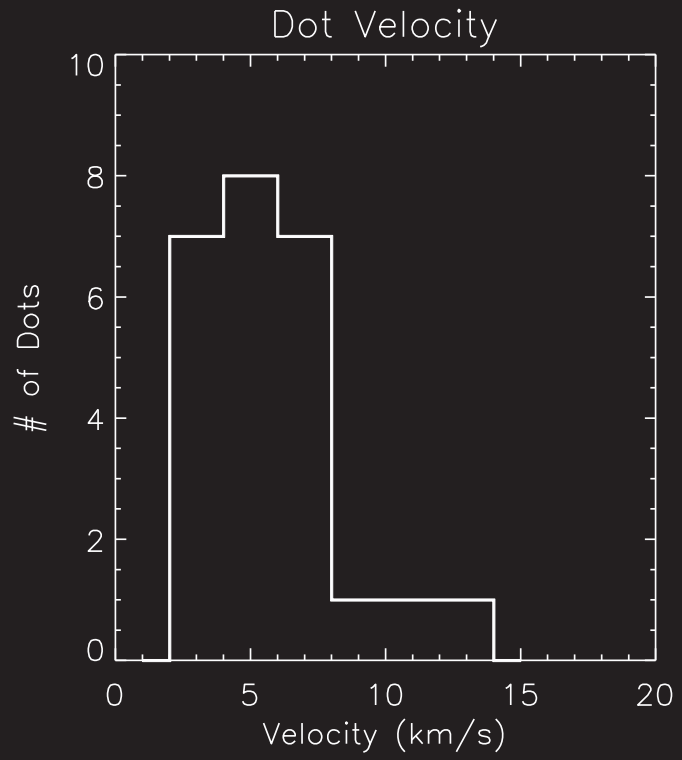


Alpert et al. (2014) (pending)

Quantitative – Velocity

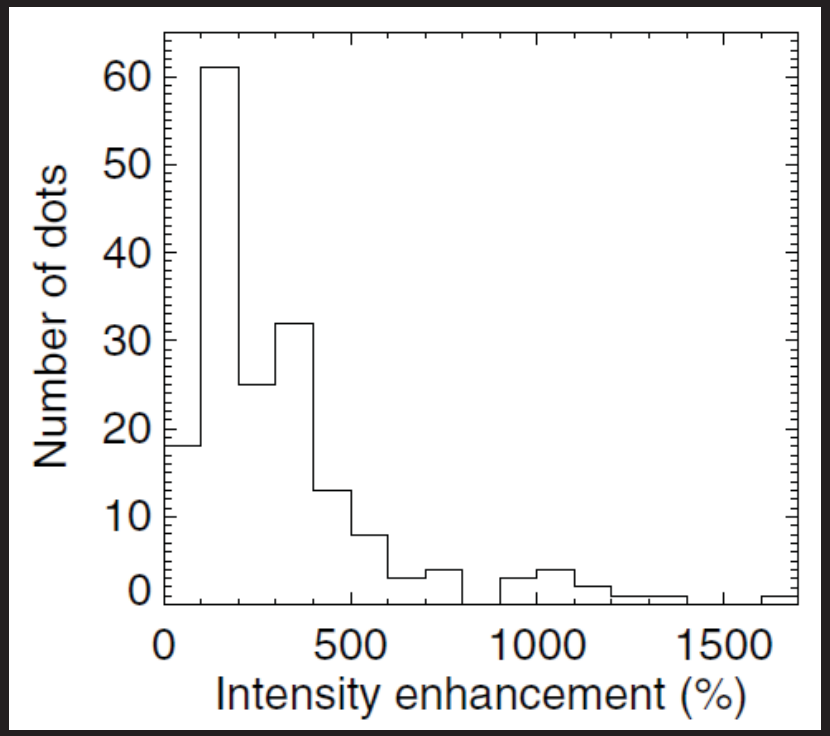


Tian et al., 2014, ApJ, 790, L29

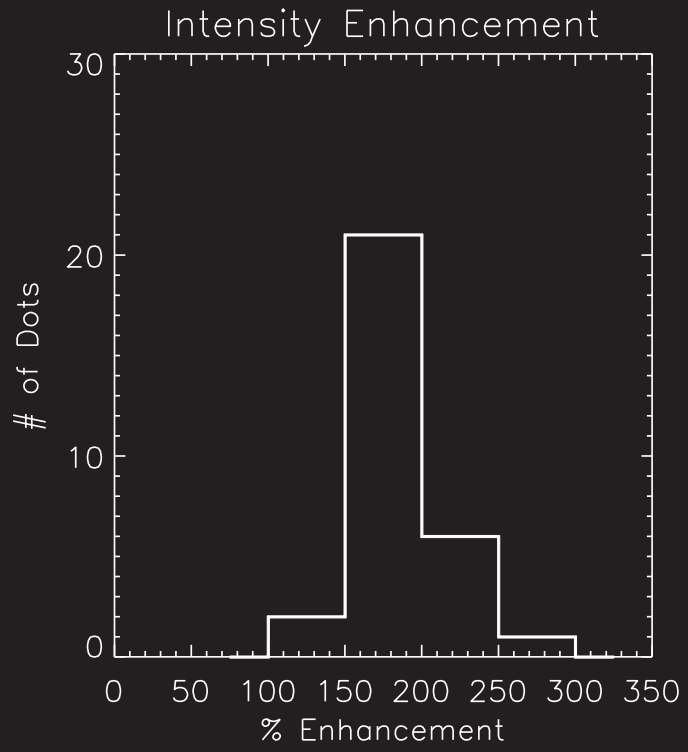


Alpert et al. (2014) (pending)

Quantitative Properties – Intensity

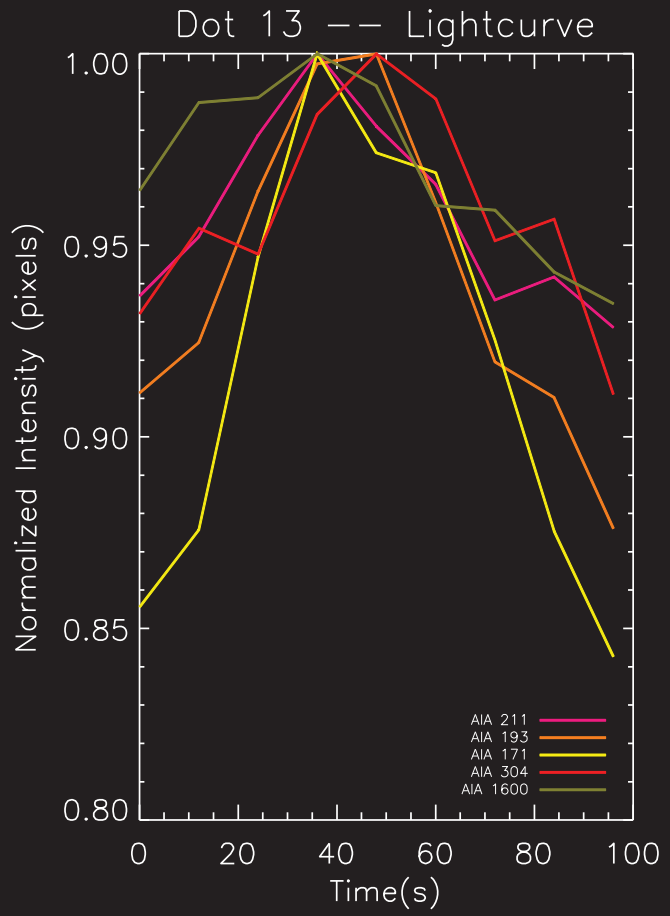


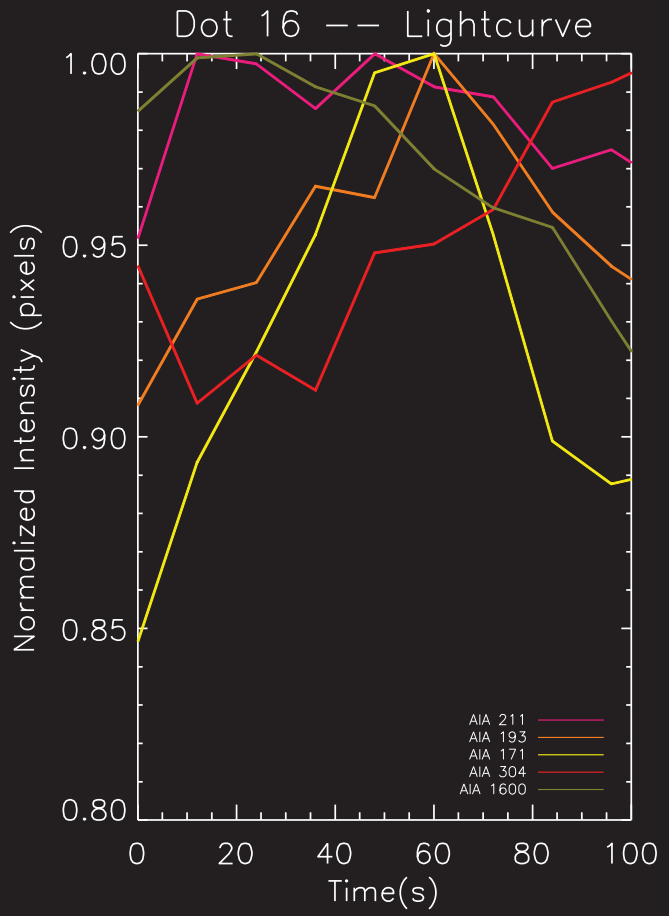
Tian et al. (2014) ApJ, 790, L29



Alpert et al. (2014) (pending)

Quantitative – Lightcurves

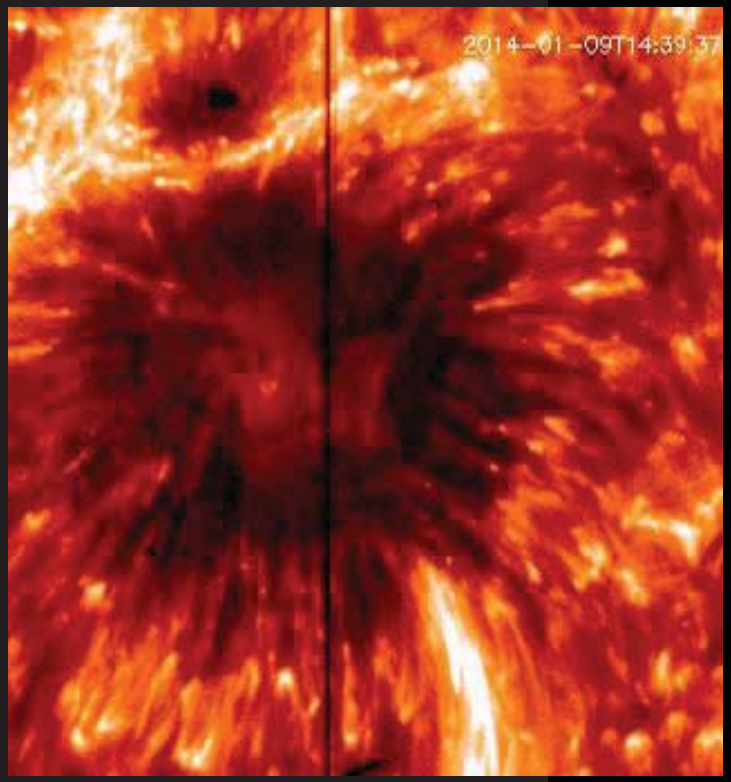




Comparison to IRIS Observations

	Tian et al. (IRIS)	This research (Hi-C)
Length (km)	439.0	557.7
Width (km)	352.3	472.4
Lifetime (s)	41.3	268
Speed (km/s)	N/A	5.8
Intensity Enhancement (%)	319.4	188

Comparison to IRIS Observations



Tian et al., 2014, ApJ, 790, L29

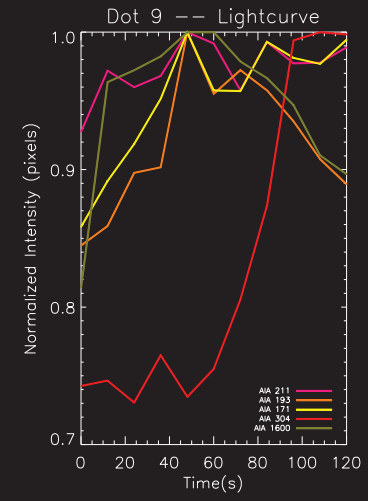
Possible Causes

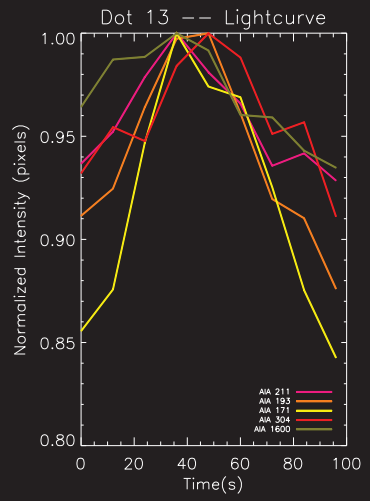
- Plasma downflow/falling plasma
- Repeated reconnection → nanoflares
- Upflows
- Oscillatory motion due to waves

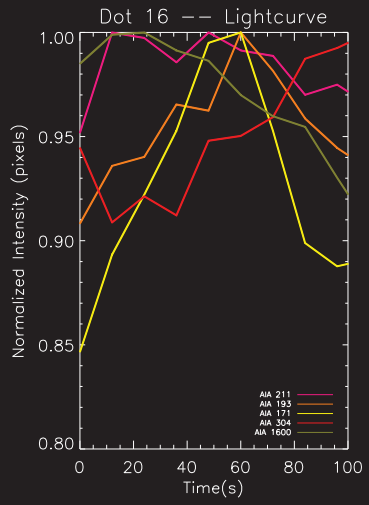
Future Work

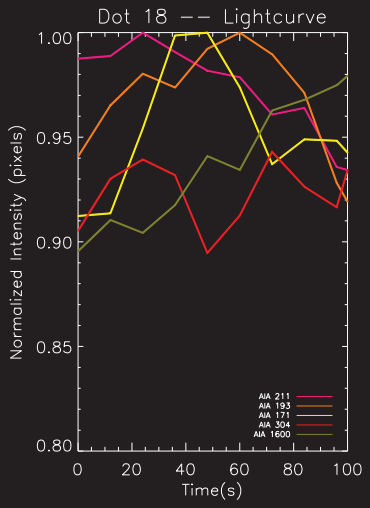
- Examine lightcurves
- Larger sample of dots
- Numerical modeling to test possible mechanisms

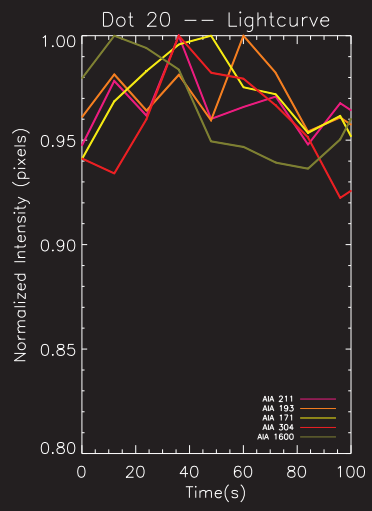
Thank you!

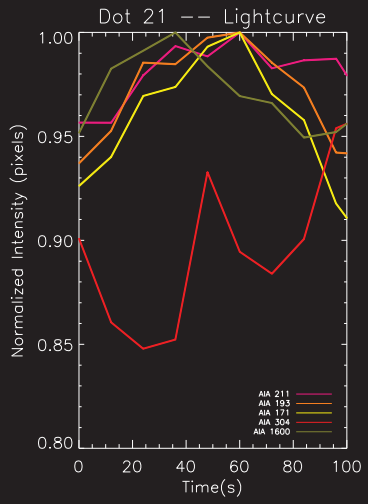

Dot 9 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600

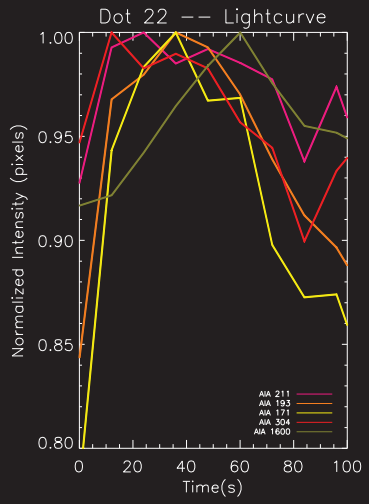

Dot 13 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600

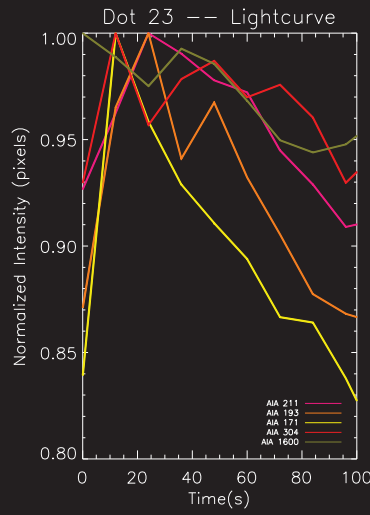

Dot 16 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600

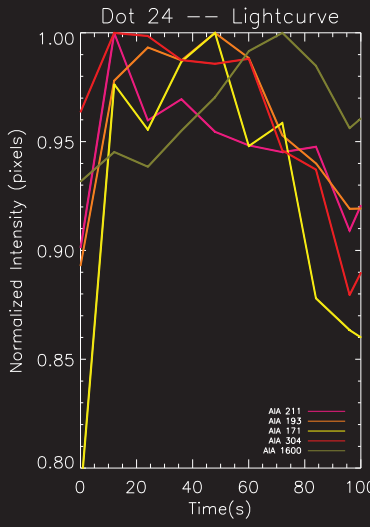

Dot 18 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600

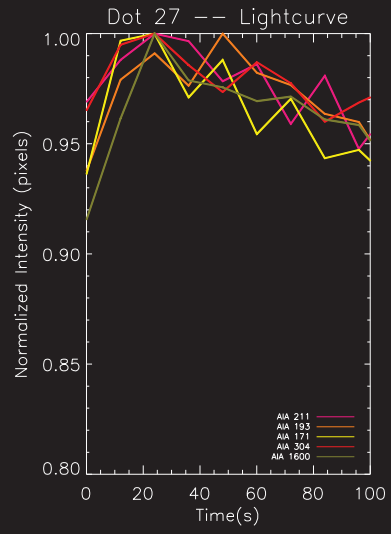

Dot 20 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600


Dot 21 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600


Dot 22 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600


Dot 23 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600


Dot 24 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600


Dot 27 -- Lightcurve
Normalized Intensity (pixels)
Time(s)
AIA 211
AIA 193
AIA 171
AIA 304
AIA 1600